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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/509,346	04/04/2005	Manfred Vogel	10191/3470	5335
26646	7590	11/03/2005	EXAMINER	
KENYON & KENYON ONE BROADWAY NEW YORK, NY 10004			GIMIE, MAHMOUD	
			ART UNIT	PAPER NUMBER
			3747	

DATE MAILED: 11/03/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

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Office Action Summary**Application No.**

10/509,346

Applicant(s)

VOGEL ET AL.

Examiner

Mahmoud Gimie

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 April 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 15-32 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 15-32 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 27 September 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
 Paper No(s)/Mail Date 9/27/04.
- 4) ☐ Interview Summary (PTO-413)
 Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 15-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kyugo et al (JP57000361) in view of Kanao (US 6,724,132).

Kyugo et al discloses a fuel injection system, comprising: a fuel injector having spray-discharge orifice; a spark plug having a spark plug insulator (3), a first electrode (12), and a second electrode, wherein the spark plug insulator at least partially surrounds the first electrode, and wherein the second electrode is set apart from the first electrode by a spark gap (14) and is disposed in front of the spray-discharge orifice (11) with a clearance (1); and a shared housing (3) surrounding the fuel injector and the spark plug insulator (5), see figure 1.

Kyugo as best understood, does not teach the air gap to be between approximately 50 to 300 micrometers.

Kanao teaches the air gap (G) ≥ 0.2 mm ($G \geq 200$ micrometers).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to modify the invention of Kyugo by making the spark air gap (G) ≥ 0.2 mm as

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taught by Kanao. The motivation to do so would have been to require less energy to overcome the air gap.

Note: it appears from figure 1 that Kyugo teaches a small clearance (l) between the fuel ports and the electrodes that is assumed to be approximately 3 to 15 millimeters

With regard to claim 16, wherein the second electrode is fixed on the shared housing (3).

With regard to claim 17, wherein the first electrode and the second electrode have a substantially rectilinear shape and are positioned substantially diametrically opposite to one another.

With regard to claim 18, wherein the first electrode and the second electrode are bent in the form of a graduated circle.

With regard to claim 19, wherein the first electrode has a first end, the second electrode has a second end, and the first end and the second end face one another.

With regard to claim 20, wherein the first end and the second end are chamfered is an obvious design choice.

With regard to claim 21, wherein the first end and the second end are tapered conically is an obvious design choice.

With regard to claim 22, wherein the fuel injector has a longitudinal axis inside the shared housing, and the first electrode has a first portion and a first bent end, and the second electrode has a second portion and a second bent end, the first portion and the second portion being positioned substantially parallel to the longitudinal axis, and the first bent end and the second bent end forming the spark gap, see figures 5 and 6.

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With regard to claim 23, wherein the first bent end has a first angle, the second bent end has a second angle, and the first angle and the second angle are substantially right angles, see figure 1.

With regard to claims 24-26, see at least figures 1-6 for electrodes orientation.

With regard to claim 27, figure 4 shown an inward opening fuel injector

With regard to claim 28, see at least figures 1,5 and 6.

With regard to claims 29-31, see above comparable rejections or figures 1-6.

With regard to claim 32, see at least figures 1-6 for tangential orientation of fuel spray.

Conclusion

3. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. The cited references show fuel injector and/or spark plug for internal combustion engines.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

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Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mahmoud Gimie whose telephone number is 571-272-4841. The examiner can normally be reached on Monday-Friday between 7 a.m. -3:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Henry Yuen can be reached on 571-272-4856. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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MAHMOUD GIMIE
PRIMARY EXAMINER